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April 11, 2017

Via Registered Mail – Return Receipt Requested

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U.S. Environmental Protection Agency
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1200 Pennsylvania Avenue, N.W.
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Washington, DC 20460

Mr. Michael S. Regan, Secretary
Mr. Michael Scott, Director, Division of Waste Management
N.C. Department of Environmental Quality
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Ms. Lynn J. Good, President and Chief Executive Officer
Duke Energy Progress, LLC
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Mr. William Thacker, Plant Manager
Mayo Electric Generating Plant
Duke Energy Progress, LLC
10660 Boston Road
Roxboro, NC 27574

Notice of Intent to Sue
Resource Conservation and Recovery Act - 42 U.S.C. § 6972

RE: Duke Energy's Coal Ash Open Dump at its Mayo Steam Plant in Person County, N.C.: Violation of the Resource Conservation and Recovery Act and the Coal Combustion Residuals Rule by Duke Energy Progress LLC.

To Whom It May Concern:

Pursuant to 42 U.S.C. § 6972(a)(1)(A) and (b), the Roanoke River Basin Association (the Association) through its counsel, the Southern Environmental Law Center, gives Duke Energy Progress LLC (Duke Energy) notice of its intent to file suit for violations of the Resource Conservation and Recovery Act (the Act) and the Coal Combustion Residuals Rule (the Rule), 40 C.F.R. § 257.50 *et seq.*, adopted pursuant to the Act. After the expiration of sixty (60) days as

provided in the Act, the Association plans to file suit in United States District Court against Duke Energy to enforce the provisions of the Rule and the Act.

Duke Energy's Open Dump at Mayo

Duke Energy's closure plan for its unlined coal ash lagoon at its Mayo Steam Station is open dumping in violation of the requirements of the Rule and the Act. 40 C.F.R. § 257.1(a)(2) ("Practices failing to satisfy any of the criteria in . . . §§ 257.50 through 257.107 constitute open dumping, which is prohibited under section 4005 of the Act."). Duke Energy cannot be allowed to operate an illegal open dump at its Mayo coal ash site in perpetuity.

Unlined Polluting Coal Ash Storage at Mayo

Duke Energy stores approximately 6.6 million tons of coal ash in an unlined pit at its Mayo Steam Station ("Mayo") on the banks of Mayo Lake in Person County. **This coal ash sits 80 feet deep in groundwater, where it leaches pollutants that contaminate the groundwater and adjacent surface waters.**

United States Geological Survey topography of the site before the basin was constructed shows the elevation at the bottom of what is now the basin is 400 feet above sea level, while Duke Energy's own reports show that currently the groundwater elevation within the basin is at least 480 feet above sea level. *See* Duke Energy, Comprehensive Site Assessment (Sept. 2, 2015) ("CSA"), Figure 6-2.[1] Thus, the coal ash currently is submerged approximately 80 feet deep in groundwater at Mayo.

The coal ash lagoon is over 30 years old, and its waters are held back only by a dam made of earth that leaks. The coal ash lagoon leaks pollution into the groundwater and into two water bodies, Mayo Lake and Crutchfield Branch.

Mayo Lake is an important public waterbody and recreational, fishing, and economic resource for North Carolina, the region, and Person County. Families live along the lake. Local residents, people who live in surrounding communities, and visitors from other areas fish, swim, and boat in and on the Lake. Over the years, Mayo Lake has been seriously harmed by the pollution from Duke Energy's coal ash lagoon.

A recent study by Duke University scientists determined that Duke Energy's pollution of Mayo Lake continues to contaminate fish with selenium, a coal ash pollutant. Brandt, et al., *Selenium Ecotoxicology in Freshwater Lakes Receiving Coal Combustion Residuals Effluent: A North Carolina Example*, Environmental Science and Technology (January 2017).

Crutchfield Branch is part of the Roanoke River Basin and is a water of the United States and of North Carolina. It originates south of Duke Energy's Mayo coal ash lagoon, flows into and through the lagoon, and flows out of the lagoon to the north through North Carolina and into Virginia. Duke Energy's site assessment studies explain that the unlined coal ash basin at Mayo "acts as an elongated bowl-like feature with groundwater flowing to the basin from all sides,

[1] *Available at* http://edocs.deq.nc.gov/WaterResources/0/fol/305049/Row1.aspx.

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except from the northeast, which is the discharge side from the basin. Groundwater flows north-northeast from the ash basin into the small valley formed by Crutchfield Branch." CSA at 30. Crutchfield Branch becomes part of the Dan River, flowing into Virginia before flowing back into North Carolina further downstream.

Chromium, manganese, and other pollutants have been detected in groundwater near the leaking, unlined coal ash pits at Mayo. For example, chromium has been detected at 301% above the state groundwater standard, and manganese – associated with nervous system and muscle problems – at 2,780% above the standard. The coal ash pit has contaminated groundwater with numerous coal ash pollutants, including antimony, arsenic, barium, boron, chromium, cobalt, iron, manganese, pH, thallium, total dissolved solids, and vanadium. As long as the coal ash remains in the groundwater and in unlined storage, it will continue to contaminate groundwater and adjacent surface waters.

Duke Energy's coal ash in the groundwater at Mayo has polluted both Crutchfield Branch and Mayo Lake, as the polluted groundwater moves from the coal ash submerged in groundwater into Crutchfield Branch and Mayo Lake. Sampling in Crutchfield Branch and Mayo Lake has revealed elevated levels of many coal ash pollutants, including boron, cobalt, copper, thallium, vanadium, and selenium, among others.

Duke Energy has faced extensive public pressure and litigation by the Association and other community organizations in North Carolina to force it to address its primitive, unlined, and leaking coal ash storage in North Carolina. In May of 2015, Duke Energy operating companies, including the owner of the Mayo coal ash lagoon, pleaded guilty 18 times to 9 Clean Water Act coal ash crimes across North Carolina. These Clean Water Act crimes included unpermitted coal ash lagoon discharges very much like those flowing from the Mayo coal ash lagoon. Duke Energy operating companies paid a $102 million fine, and they are under nationwide criminal probation. Under court orders, the criminal plea agreement, statutes, regulatory requirements, and settlement agreements with conservation groups, Duke Energy is now required to excavate all the coal ash from unlined coal ash pits at 8 of its 14 coal ash storage sites in North Carolina, and all its sites in South Carolina.

Today, Duke Energy is required to excavate the coal ash from every North Carolina and South Carolina site with 7 million tons or less of coal ash – except Mayo.

At Mayo and five other coal ash storage sites in North Carolina, Duke Energy has refused to commit itself to remove the ash from its unlined, leaking, polluting, dangerous, and primitive coal ash pits. Instead, Duke Energy hopes to pump coal ash polluted water out of its leaking lagoons into nearby lakes and rivers and then leave its polluting coal ash in the groundwater, in unlined pits near water bodies, where the coal ash will continue to pollute the state's waters forever.

The Coal Combustion Residuals Rule

Effective October 19, 2015, the United States Environmental Protection Agency (EPA) published a final rule to regulate the disposal and storage of coal combustion residuals (CCR) as

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a solid waste under subtitle D of the Act. U.S. EPA, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, 80 Fed. Reg. 21,302, 21,312 (Apr. 17, 2015); *as amended by* Technical Amendments to the Hazardous and Solid Waste Management System, Disposal of Coal Combustion Residuals from Electric Utilities—Correction of the Effective Date, 80 Fed. Reg. 37,988 (July 2, 2015); 40 C.F.R. § 257.50 *et seq*.

Under the Act, any violation of the requirements of the Rule constitutes illegal open dumping: "Practices failing to satisfy *any of the criteria* in . . . §§ 257.50 through 257.107 constitute open dumping, which is prohibited under section 4005 of the Act." 40 C.F.R. § 257.1(a)(2) (emphasis added). 40 C.F.R. § 257.2 ("Open dump means a facility for the disposal of solid waste which does not comply with this part.").

Under the Rule, by no later than October 17, 2016, Duke Energy was required to "prepare an initial written closure plan consistent with the requirements specified in paragraph (b)(1) of [40 C.F.R. § 257.102]" for coal ash lagoons like the one at Mayo. 40 C.F.R. § 257.102(b)(2). The Rule contemplates two options for closure, either removal of the ash, also described as clean closure, or leaving the ash in place, sometimes called "cap in place."

The Rule requires that a closure plan in which ash will be left in an unlined lagoon must describe "how the final cover system will achieve the performance standards specified in paragraph (d) of this section." *Id.* § 257.102(b)(1)(iii).

In particular, the closure plan must demonstrate that if the ash is left in place, it will achieve the following performance standard requirements to:

- "Control, minimize or eliminate, to the maximum extent feasible, post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the ground or surface waters." *Id.* § 257.102(d)(1)(i);
- "Preclude the probability of future impoundment of water, sediment, or slurry." *Id.* § 257.102(d)(1)(ii); and the requirement that
- "Free liquids must be eliminated by removing liquid wastes or solidifying the remaining wastes and waste residues." *Id.* § 257.102(d)(2)(i).

Thus, if an owner proposes to close a coal ash lagoon by leaving the ash in place with a cover on top, the closure plan must demonstrate that groundwater will not continue to flow through the coal ash, in order to satisfy the requirement to "[c]ontrol, minimize or eliminate, to the maximum extent feasible, post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the ground or surface waters."

The closure plan must also "[p]reclude the probability of future impoundment of water, sediment, or slurry." "[I]mpoundment means a natural topographic depression, man-made excavation, or diked area, which is designed to hold an accumulation of CCR and liquids, and the unit treats, stores, or disposes of CCR." 40 C.F.R. § 257.53. If groundwater will remain in the coal ash basin, the basin remains an impoundment that stores an accumulation of CCR and

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liquids. Further, if the closure plan retains the coal ash impoundment's dam, in whole or in part, then the closure plan fails to preclude the impoundment of water. Similarly, such a closure plan that leaves coal ash saturated in groundwater within the impoundment leaves the wet coal ash impounded behind the dam of the coal ash lagoon, and thus fails to prevent the impoundment of coal ash sediments and slurry.

Finally, if groundwater will continue to saturate coal ash within the proposed "cap in place" storage area, then the closure plan cannot satisfy the requirement that "[f]ree liquids must be eliminated by removing liquid wastes or solidifying the remaining wastes and waste residues." "Free liquids" are defined under RCRA as "liquids that readily separate from the solid portion of a waste under ambient temperature and pressure." 40 C.F.R. § 257.53. Groundwater that saturates coal ash in an unlined impoundment is free liquid that readily separates from the solid portion of the waste. Utilities regularly separate the water that saturates their impoundment coal ash by "stacking" the ash, *i.e.*, piling up the ash on dry land to let the water drain out. In addition, groundwater readily separates from coal ash because it flows *through* the coal ash, as shown by the movement of pollutants out of unlined coal ash basins into the surrounding groundwater; it does not remain in the coal ash indefinitely, but rather flows out of the ash and is replaced by new groundwater infiltrating into the basin. For this reason, a closure plan that fails to stop the ongoing flow of groundwater into an unlined basin will violate this provision of the CCR rule because it does not eliminate free liquids and also because it fails to solidify the wastes in the basin.

The EPA has confirmed the plain language of the Rule. It has explained that a coal ash lagoon may not be closed by leaving coal ash submerged in groundwater. Instead, the operator of the unit must comply with the rule by "'clean closing' [excavating] the submerged portion" of the coal ash." EPA Response to "What are options and the performance standards for closure of units under the CCR Rule?" (Attached as Exhibit 1, at 6).

Duke Energy's Plan to Leave Coal Ash in Groundwater at Mayo

On November 11, 2016, as required by the Rule, 40 C.F.R. § 257.102(b), Duke Energy published a closure plan for Mayo. This closure plan is attached as Exhibit 2. The closure plan leaves the coal ash in place in the Mayo coal ash lagoon, with "dewatering" of the basin and placing a cap on top. Likewise, under the North Carolina Coal Ash Management Act, N.C. Gen. Stat. § 130A-309.200 *et seq.*, Duke Energy was required to submit a Corrective Action Plan (CAP) setting out its plan for closure of the Mayo coal ash lagoon. The CAP recommends the same "cap in place" closure method.

However, Duke Energy's closure plan leaves coal ash in the groundwater within the unlined coal ash basin at Mayo, impounded behind the ash pond dam. Duke Energy's CAP Part 1[2] and its own modeling results show that much of the coal ash in the Mayo ash basin will remain submerged in the groundwater under the cap in place plan contained in Duke Energy's CCR Rule filing. Comparison of the modeled hydraulic head map for the Cap in Place option (CAP Pt. 1, Appendix E, Figure 17a, attached hereto as Exhibit 3) with the Closure in Place Profile (*id.*, Figure 16, attached hereto as Exhibit 4) reveals that much of the disposed ash would

[2] *Available at* http://edocs.deq.nc.gov/WaterResources/0/fol/321551/Row1.aspx.

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remain saturated after capping. Indeed, Duke Energy's own data show that the coal ash at Mayo will remain submerged in the groundwater by as much as 70 feet if the ash is capped in place. The closure plan contains no mechanism to stop the flow of groundwater into the basin or separate the ash from the groundwater table, and Duke Energy witnesses have confirmed under oath that no such measures are part of the closure plan at Mayo.

Additionally, Duke Energy's closure plan makes clear that it does not intend to completely and permanently remove interstitial and pore water, which is the water saturating the ash and which has the highest concentrations of contaminants. Duke Energy's plan states that it "may" remove this water "as needed" only "to provide a workable surface for final cover system installation." The closure plan will "partial[ly] lower[]" – but not remove – the ash pond dam (Ex. 2, at 2).

Thus, under Duke Energy's closure plan set out in its CCR Rule filing, the coal ash will be sitting in groundwater and will continue to leach pollutants into the groundwater and into Crutchfield Branch and elsewhere. This coal ash will remain saturated, allowing pollutants to leach out indefinitely, and will remain impounded behind the unlined ash pond dam under the closure plan. This plan does not and cannot meet the CCR rule performance standards at 40 C.F.R. § 257.102(d).

The data presented in Duke Energy's figures are consistent with the hydrogeology of the site. A significant amount of groundwater will continue to infiltrate the ash basin from adjacent areas as it flows into the bowl-like coal ash basin and is channeled into Crutchfield Branch. Groundwater that infiltrates the ash will continue to leach metals from the ash and transport those metals down-gradient before discharging into Crutchfield Branch. From there these pollutants will be flushed across the state line to Virginia and then back into North Carolina through the Roanoke River Basin.

In addition, under the North Carolina Coal Ash Management Act, Duke Energy was required to submit a Comprehensive Site Assessment for Mayo. That Assessment confirms that the Mayo coal ash is in the groundwater and is polluting groundwater and surface water: "The CSA found that leaching of CCR accumulated in the ash basin is a source of COIs [constituents of interest, *i.e.*, pollutants] detected in groundwater and surface water downgradient of the basin." CSA at 127. This pollution will continue if Duke is allowed to leave the ash in tens of feet of groundwater and in this unlined pit, where pollutants have been flowing into groundwater, Mayo Lake, and Crutchfield Branch for decades.

Duke Energy's Violation of the CCR Rule

Duke Energy is violating 40 C.F.R. §§ 257.102(b) and (d). Duke Energy has prepared and published a CCR Rule closure plan that fails to meet the minimum requirements for closure plans and violates the CCR Rule by leaving Mayo coal ash in groundwater and impounded behind a dam.

It will not "control, minimize or eliminate, to the maximum extent feasible, post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the

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ground or surface waters." As Duke Energy's own modeling shows, the coal ash in the basin will remain saturated in groundwater. Further, the closure plan will not "preclude the probability of future impoundment of water, sediment, or slurry," because the closure plan will "partial[ly] lower[]" – but not remove – the ash pond dam (Ex. 2, at 2), and thus this saturated coal ash will remain impounded by the ash basin dam. And capping in place and leaving the coal ash in groundwater at Mayo will neither remove contaminated liquid wastewater, nor solidify the ash in the basin. As a result, the plan fails to "eliminate" "free liquids . . . by removing liquid wastes or solidifying the remaining wastes."

Duke Energy was required to prepare and publish a CCR Rule closure plan that complies with the Rule. Under the CCR Rule, Duke Energy's Mayo closure plan must not leave coal ash in groundwater or leave wet ash and water impounded in the basin – yet it will do all of these things. Duke Energy thus violated and continues to violate the CCR Rule and RCRA. To comply with the CCR Rule and RCRA, Duke Energy must prepare and publish a CCR Rule closure plan for the Mayo coal ash lagoon that does not leave any coal ash in the groundwater and that is not an impoundment. This violation occurred on October 17, 2016, on November 11, 2016, and is ongoing.

PERSONS RESPONSIBLE FOR VIOLATIONS

Mayo is owned and operated by Duke Energy. Duke Energy is a corporation with its principal place of business in North Carolina. Duke Energy is responsible for all violations at Mayo.

PERSONS GIVING NOTICE

The Roanoke River Basin Association is a § 501(c)(3) non-profit public interest organization with members in North Carolina and Virginia operating in the Roanoke River Basin watershed.

The Association and its members have been harmed by Duke Energy's violations of RCRA and the CCR Rule. They recreate, fish, and own property in the Roanoke River Basin, including in the vicinity of and downstream from Mayo, including Crutchfield Branch and Mayo Lake and the waterways into which they discharge and into which their waters flow. They fear contamination of drinking water, wildlife, and river water, by groundwater contamination, discharges, and pollution from coal ash in groundwater in Duke Energy's Mayo coal ash lagoon. Duke Energy's storage of coal ash in groundwater and its contamination, discharges, and pollution from coal ash in groundwater are reducing the use and enjoyment by the Association and its members of the Roanoke River Basin, Mayo Lake, Crutchfield Branch, and the waterways into which their waters flow.

The names, addresses, and phone numbers of the persons giving notice are:

Michael Pucci, President
Roanoke River Basin Association
150 Slayton Avenue

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Danville, Virginia 24540
(434) 766-6727.

The Association believes that a negotiated settlement of these violations, codified through a court-approved consent decree, would be preferable to protracted litigation. However, if we are unable to reach an enforceable settlement agreement, the Association is prepared to file suit in the United States District Court for the Middle District of North Carolina, or other appropriate court, pursuant to 42 U.S.C. § 6972(a)(1)(A), after sixty days from receipt of this letter. This lawsuit will seek injunctive relief, fees and costs of litigation, and such other relief as the Court deems appropriate.

If you have any questions concerning this letter or the described violations, or if you believe this notice is incorrect in any respect, please contact the undersigned counsel, the Southern Environmental Law Center, at (919) 967-1450 (tel.), (919) 929-9421 (fax). During the notice period, we are available to discuss this matter with you, but suggest if you desire to institute negotiations in lieu of a civil action that you do so immediately as we do not intend to delay prosecution of this suit once the notice period has expired. Please be advised that the failure to remedy any of the violations set forth in this letter can result in a court order enjoining further violations, and upon the successful prosecution of this suit, the Conservation Groups intend to seek compensation for attorneys' fees and the costs of litigation under the citizen suit provisions of 42 U.S.C. § 6972(e).

Thank you for your prompt attention to this matter.

Sincerely,

Frank Holleman III NST

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Enclosures

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cc:
Via certified mail – return receipt requested (w/encl.):

V. Anne Heard, Acting Regional Administrator, U.S. EPA, Region 4
Josh Stein, North Carolina Attorney General
Sandra J. Hairston, Acting U.S. Attorney, Middle District of North Carolina
CT Corporation System, registered agent for Duke Energy Progress

Via e-mail (w/encl.):

Mary Wilkes, U.S. EPA, Region 4
Mark Nuhfer, U.S. EPA, Region 4
Karrie-Jo Shell, U.S. EPA, Region 4
Gina Fonzi, U.S. EPA, Region 4
Matthew Hicks, U.S. EPA, Region 4
Bill Lane, NC DEQ General Counsel

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EXHIBIT 1

Relationship Between the Resource Conservation and Recovery Act's Coal Combustion Residuals Rule and the Clean Water Act's National Pollutant Discharge Elimination System Permit Requirements

The Coal Combustion Residuals (CCR) rule, promulgated under the Resource Conservation and Recovery Act (RCRA), and the Clean Water Act (CWA) each address environmental impacts of the various units at coal fired power plants. As a general matter, the Clean Water Act addresses instances in which there are discharges to the jurisdictional waters of the United States ("jurisdictional waters"), while the CCR rule deals with the disposal units themselves (where they are located, specific design and operating criteria, structural stability requirements, groundwater monitoring and corrective action, closure of the units, etc.) and with their impacts or potential impacts to groundwater. The CCR rule establishes minimum national criteria which must be met by all disposal units; the rule additionally recognizes that different factors on a site specific basis are important for determining the best method of environmental protection at individual disposal unit sites and thus provides technical criteria to enable flexibility where appropriate to achieve the requirements of the rule. For example, in some cases, dewatering and leaving CCRs in place with safeguards and monitoring may achieve the necessary environmental protections and in fact offer a significantly lower environmental footprint and cost than removal and disposal off site.

On this page:

Questions Regarding the Relationship Between the CCR Rule and CWA NPDES Permit Requirements

How do the CCR rule and the CWA permit requirements generally work together with respect to landfills and surface impoundments that contain CCRs?

The CCR rule is designed specifically to address releases to groundwater as well as non-groundwater releases from CCR waste disposal units. Implementation of actions to comply with the CCR rule, such as dewatering of a CCR unit, must be done in compliance with other applicable laws, including

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the Clean Water Act. Independent of the CCR rule, the CWA prohibits any point source discharge of a pollutant to a water of the United States unless it is authorized by a National Pollutant Discharge Elimination System (NPDES) permit under CWA section 402.

What role does dewatering of CCR units play in compliance with the CCR rule? Is a facility that seeks to dewater a CCR surface impoundment required to obtain a CWA NPDES permit? How does this work and can EPA help to ensure that NDPES permits are granted in a timely manner to allow dewatering and closure to proceed?

Dewatering of CCR units is an important step in the process of closure of CCR units in order to comply with the CCR rule, and may require discharge to a jurisdictional waters. If the facility will need to discharge any of the water from the surface impoundment into a jurisdictional water, then, as required by the Clean Water Act, that facility will need an NPDES permit (or potentially a modification to an existing permit) for that discharge.

The dewatering of a surface impoundment is a necessary first step in ensuring that the eventual closure of the unit will meet the statutory standard under RCRA of "no reasonable probability of adverse effects on human health or the environment." Over the long-term the closure of the CCR unit will substantially reduce the significant health and environmental risks associated with these units--e.g., from the potential catastrophic release, and/or contamination from leaching into groundwater, as well as into any hydrologically connected jurisdictional waters. In the short term the point source discharge will be subject to NPDES permit requirements under CWA section 402 which "restores and maintains the chemical, physical, and biological integrity of the Nation's waters."

EPA encourages the water and waste programs in the states to work together in this area to ensure that closure of the CCR unit can proceed in a timely fashion while at the same time ensuring that NPDES permit conditions are in place to protect the receiving jurisdictional waters.

Can the ground water, corrective action, closure and post closure requirements under RCRA's CCR rule be implemented in a manner consistent with protection of surface water under the CWA? Can the closure in place option in the CCR rule be conducted in a manner consistent with protection of surface water under the CWA?

Yes, the comprehensive requirements of the CCR rule were designed specifically to address all releases to groundwater as well as non-groundwater releases, from CCR disposal units and the impacts of those releases on public health and the environment.

The CCR rule specifically provides a closure in place option, and anticipates that owner/operators would be able to utilize this option in appropriate circumstances. Provided the requirements of the CCR rule as well as the CWA are met, the CCR rule's closure in place option can be implemented consistent with protection of groundwater and surface water resources. See the closure requirements question below for more detail.

Does the issuance of an NPDES permit covering discharges from a CCR unit exempt the owner/operator from any requirements under the CCR rule?

No, discharges covered by an NPDES permit are not a "solid waste" pursuant to RCRA section 1004 (27). The RCRA exclusion only applies to "industrial discharges that are point sources subject to permits," i.e., to the discharges to jurisdictional waters, and not to any activity, including groundwater

releases or contaminant migration, that occurs prior to that point. See title 40 of the Code of Federal Regulations (CFR) § 261.4(a)(2)("This exclusion applies only to the actual point source discharge. It does not exclude industrial wastewaters while they are being collected, stored or treated before discharge"). For purposes of the RCRA exclusion, EPA considers the "actual point source discharge" to be the point at which a discharge reaches the jurisdictional waters, and not in the groundwater or otherwise prior to the jurisdictional water. Thus, the issuance of an NPDES permit for discharges from a facility's CCR surface impoundment would not exempt the owner/operator from any requirements under the CCR rule applicable to the disposal unit, such as the requirements to ensure the structural stability of the unit, to clean up all releases to the aquifer, and to meet all closure standards.

Releases and the Requirement to Respond

What is the scope of the requirement to respond to "releases"?

(a) Does the phrase "or immediately upon detection of a release from a CCR unit" in 40 CFR § 257.96(a) apply to both groundwater and non-groundwater releases?

No. Section § 257.96(a) establishes two different standards for triggering corrective action, one for groundwater releases and one for non-groundwater releases. The requirement that a facility commence corrective action "immediately upon detection of a release from a CCR unit" applies only to non-groundwater releases. By contrast EPA interprets the regulation to require corrective action for groundwater releases only upon a determination that contaminants are present in amounts exceeding the groundwater protection standards in § 257.95(h).

Note, however that the regulations include other provisions that address releases from a CCR unit. For example, the inspection requirements for surface impoundments and landfills at §§ 257.83 and 257.84 state that if a deficiency or release is identified during an inspection, the owner or operator must remedy the deficiency or release as soon as feasible and prepare documentation detailing the corrective measures taken. In addition, in the requirements for control of fugitive dust at § 257.80 it states that in the annual report the owner/operator must describe any corrective measures taken in response to citizen complaints.

(b) Is a facility required to initiate corrective action to clean up groundwater contamination, even though the concentration does not exceed the groundwater protection standard?

No, under the CCR rule, a facility is not required to initiate corrective action to clean up groundwater contamination if the contamination is at levels below the groundwater protection standard established in the CCR rule. As noted, EPA interprets the regulation to require corrective action for groundwater releases only upon a determination that contaminants are present in amounts exceeding the groundwater protection standards in § 257.95(h) (that is, a statistically significant increase over background or the maximum contaminant level or MCL).

(c) In settlement of a portion of the lawsuit challenging the CCR rule, EPA agreed to a remand on the issue of defining which non-groundwater releases are subject to the full corrective action process. Please provide guidance on what facilities should do in the interim.

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EPA has committed as part of a settlement agreement to revisit the question of whether the *procedures* to be used in cleaning up groundwater releases should apply to all non-groundwater releases. EPA agreed that, in principle, for some non-groundwater releases, it may not make sense to require facilities to follow the full corrective action procedures in §§ 257.96-257.98 in cleaning up or remedying the releases, and agreed to conduct a rulemaking on that narrow issue. However, the requirement to clean up those releases remains unaffected.

It is true, however, that as currently written, the regulations do require compliance with the full corrective action process, whether pursuant to the obligation in section § 257.90(d) or § 257.96. Nevertheless, given the settlement, EPA would recommend that compliance determinations focus primarily on the rapid remediation of detected non-groundwater releases, consistent with §§ 257.90 (d), 257.73(d)(2) and 257.83(b)(5) rather than adherence to the specific corrective action procedures in §§ 257.96-257.98.

Use of Groundwater Data Obtained Prior to the CCR Rule

Can groundwater data that were not developed/obtained under the CCR rule (e.g., data that existed prior to publication of the rule) trigger the groundwater release assessment and corrective action requirements under the CCR rule (i.e., 40 CFR 257.90(d), 257.96-.98)?

If the pre-existing data and accompanying data analysis are as scientifically valid and consistent with the data and analysis required and developed under the CCR rule and they provide equivalent confidence that the standard in § 257.96 (a) has been met, such data would trigger the corrective action requirements in §§ 257.96-.98. Whether any pre-existing data are sufficiently credible to trigger the § 257.96 corrective action process will necessarily be determined on a case-by-case basis.

However, as a general matter, if a facility has any data that indicates groundwater contamination may be occurring, the facility should be taking appropriate steps without hesitation to address the issue or potential issues shown by the data or sampling results. Such steps could include additional well installation, sampling or analysis--for example if the data shows contamination but the facility has not established an appropriate background level--or it could include actions to locate and address the potential source of the contamination.

Because the CCR rule was designed to be self-implementing, it contains detailed, prescriptive requirements for establishing a groundwater monitoring system and for sampling and analyzing groundwater. For example, the data collection protocol includes numerous criteria that specify monitoring locations, frequency, and chemical parameters. See §§ 257.91, 257.93-257.95. The data collected are analyzed using specific statistical protocols that provide for comparison with background and Maximum Contaminant Levels. These statistical analyses are conducted for each constituent in each monitoring well, using methodologies that meet specific performance standards. See § 257.93(f), (g). Data that have been developed following such protocols would be considered to be credible, scientifically valid, and suitable for determining whether or not a release has occurred requiring further action under the CCR rule. It is EPA's expectation that facilities will follow this exacting process and use it to determine whether and when corrective action is warranted.

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As the regulation is currently structured, the requirement to comply with the corrective action procedures in § 257.96 is predicated on the detection of "any constituent...at a statistically significant level exceeding the groundwater protection standard" (The groundwater protection standard is defined in § 257.95(h) and is either the drinking water maximum contaminant level or the background level of the contaminant). To the extent a facility has scientifically valid/credible data demonstrating that the standard in § 257.96(a) has been met (detection of "any constituent...at a statistically significant level" above a groundwater protection standard) the rule requires them to take action to begin assessing the situation and developing a remedy.

Closure Requirements

What are the options and the performance standards for closure of units under the CCR rule?

Under the CCR rule, closure must be initiated upon the final receipt of waste (for example, where the unit has reached the end of its useful life or the owner/operator has determined that the unit is no longer needed) or in response to a determination that the unit must close "for cause" (i.e., that is the unit does not meet location standards, the unit does not meet structural stability requirements, or the unit is an unlined surface impoundment that is contaminating groundwater). Moreover, all units must prepare closure and post closure care plans by October 17, 2016, and post them to the facility's CCR web site by November 16, 2016.

The CCR rule establishes two options for closure: clean closure or closure with waste in place. The regulations also establish performance standards for each option that must be met.The two standards are described below:

(a) Section 257.102(c) sets out the "clean closure" requirements and states that: an owner or operator may elect to close a CCR unit by removing and decontaminating all areas affected by releases from the CCR unit. CCR removal and decontamination of the CCR unit are complete when constituent concentrations throughout the CCR unit and any areas affected by releases from the CCR unit have been removed and groundwater monitoring concentrations do not exceed the groundwater protection standard established pursuant to § 257.95 (h) for constituents listed in appendix IV to this part.

If a facility "clean closes" a unit, that unit is not subject to post-closure care (that is continued GW monitoring or corrective action) as the site essentially has been "cleaned up."

(b) Section 257.102(d) sets out the requirements/performance standards for closure with waste in place.

i. Paragraph (d)(1) - Must ensure that the CCR unit is closed in a manner that at a minimum will "*control, minimize, or eliminate to the maximum extent feasible,* post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the ground or surface waters or to the atmosphere; preclude the probability of future impoundment of water, sediment, or slurry; include measures that provide for slope stability; minimize the need for future maintenance; and be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices" (emphasis added).

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ii. Paragraph (d)(2) - Drainage and stabilization of CCR surface impoundments – before installing a final cover system, free liquids must be eliminated by removing liquid wastes or solidifying the remaining waste and waste residues and remaining wastes must be stabilized sufficient to support the final cover system.

iii. Paragraph (d)(3) - Sets out requirements for the final cover system.

In order to close a unit with waste in place, the facility must meet all of the performance standards in § 257.102(d). If the facility is unable to meet the performance standards for closure with waste in place for a particular unit, it must clean close the unit. Whether any particular unit or facility can meet the performance standards for closure with waste in place is a site-specific determination that will depend on a number of factual and engineering considerations, such as the hydrogeology of the site, the engineering of the unit, and the kinds of engineering measures available. For example, if a small corner of a unit is submerged in the underlying aquifer, a facility might be able to meet the performance standard for closure with waste in place for the majority of the unit, by "clean closing" the submerged portion of the unit, and installing the necessary engineering measures to ensure that the rest of the unit meets the performance standards in § 257.102(d).

Overall, dewatering and leaving CCRs in place may offer important environmental safeguards and monitoring. Closure with waste in place may help avoid sizable transportation related impacts by eliminating the significant truck traffic that would accompany off site movement of CCRs. In addition, this option may also allow owners and operators to clean close some units while consolidating all the CCRs in a single on-site unit. On-site CCR consolidation can provide for greater land use options and flexibility. Closure with waste in place may allow owners and operators to focus their long term monitoring, care and cleanup obligations on a single unit rather than many units.

LAST UPDATED ON DECEMBER 16, 2016

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EXHIBIT 2

Prepared by:

DUKE ENERGY.

MAYO STEAM ELECTRIC PLANT

ASH BASIN

FGD FORWARD FLUSH POND

FGD SETTLING POND

CLOSURE PLAN

OCTOBER 10, 2016

Certified by:

AECOM

6000 Fairview Road, Suite 200

Charlotte, NC 28210

License Number: C-2243

MAY_CLOSE_PLN

Rev. 0

Duke Energy Progress, LLC (Duke Energy) prepared this Closure Plan for the Coal Combustion Residuals (CCR) surface impoundment (Ash Basin) at the Mayo Steam Electric Plant (Mayo) pursuant to the requirements of 40 C.F.R. § 257.102(b) of the Disposal of CCR from Electric Utilities rule, 80 Fed. Reg. 21302 (April 17, 2015). URS Corporation – North Carolina (AECOM) was retained by Duke Energy to certify that this Closure Plan meets the requirements of 40 C.F.R. § 257.102. The information contained in this Closure Plan will be used to assist Duke Energy in the closure of the Ash Basin located in Person County, North Carolina, on property owned by Duke Energy. The Flue Gas Desulfurization (FGD) Forward Flush Pond and the FGD Settling Pond (collectively, FGD Ponds) are located within the Ash Basin footprint and will be included in its closure. This Closure Plan may be amended pursuant to the requirements of 40 C.F.R. § 257.102(b)(3). Presented below are:

1. A narrative of closure activities;
2. A description of the procedures to remove CCR and decontaminate the Ash Basin (as needed);
3. A description of the final cover system designed pursuant to 40 C.F.R. § 257.102(d), a description of the methods and procedures to be used to install the final cover, and a discussion of how the final cover system will achieve the performance standards specified in 40 C.F.R. § 257.102(d);
4. An estimate of the in-place CCR inventory requiring closure;
5. An estimate of the largest area of the Ash Basin requiring a final cover;
6. A closure schedule; and
7. A written certification from a qualified professional engineer, licensed in North Carolina, that this Closure Plan meets the requirements of 40 C.F.R. § 257.102.

1 NARRATIVE OF CLOSURE ACTIVITIES

The purpose of this Closure Plan is to describe the steps necessary to close the Ash Basin and FGD Ponds consistent with recognized and generally accepted good engineering practices. Closure is designed to reduce the need for long-term maintenance, control the post-closure infiltration of liquids into the in-place CCR materials, and control the post-closure release of constituents into environmental pathways (i.e., air, surface water, and groundwater).

Although, on May 18, 2016, the North Carolina Department of Environmental Quality (NCDEQ) ranked the Ash Basin "intermediate-risk," which would require it to be dewatered and excavated pursuant to the North Carolina Coal Ash Management Act of 2014, as amended (CAMA), Duke Energy is in the process of establishing the permanent replacement water supplies required under N.C.G.S. § 130A-309.211(c1) and performing the applicable dam safety repair work required under Dam Safety Order 16-01 issued by the state of North Carolina pursuant to the North Carolina Dam Safety Law of 1967, specifically N.C.G.S. § 143-215.32. Pursuant to N.C.G.S. § 130A-309.213(d)(1), upon Duke Energy's completion of these tasks within the required time frame set forth in CAMA, NCDEQ must classify the Ash Basin as low-risk, which will allow closure either pursuant to 40 C.F.R. § 257.102(c) or (d). Although CAMA charges NCDEQ with making the final determination regarding closure method, because science

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supports closure of the Ash Basin by leaving the CCR in place, Duke Energy contemplates that the Ash Basin will be closed pursuant to of 40 C.F.R. § 257.102(d).

The method to close the Ash Basin and FGD Ponds in place will include: removal and treatment of the bulk water/free liquids; interstitial/pore dewatering (as needed) and treatment; stabilization of remaining CCR materials sufficient to support the final cover system; grading of in-place CCR materials to promote positive drainage (no ponding) and prevent sloughing or movement of the final cover system; installation of a final cover system, including stormwater management controls; partial lowering of the dam; and post-closure groundwater monitoring and cover system maintenance. The final cover system will be designed to minimize infiltration and erosion to meet, or exceed, the requirements of the final cover system specified in 40 C.F.R. § 257.102(d)(3)(i). Typically, this involves the installation of a low permeability barrier layer and a vegetated soil cover to protect the barrier layer. Existing embankments will be lowered pursuant to a NCDEQ Dam Safety permit approval. This lowering is intended to promote free drainage of storm water from the closure area.

2 CCR REMOVAL AND DECONTAMINATION

There may be some areas, primarily located around the perimeter of the Ash Basin and FGD Ponds, where closure-by-removal is selected in order to enhance surface drainage and/or to allow for development of future plant infrastructure or transmission. In-place CCR in those areas will typically be dewatered (if needed), excavated, and consolidated (placed) into the remaining portion of the basin, which will be graded and closed-in-place pursuant to 40 C.F.R. § 257.102(d).

Existing appurtenant structures, such as ditches, culverts, and miscellaneous piping, will be decontaminated and abandoned in place, removed and disposed in a permitted disposal facility, or removed and placed in a beneficial use facility identified at the time of closure. Decontamination procedures may consist of pressure washing, scrubbing, or other generally accepted decontamination procedures.

Pursuant to 40 C.F.R. § 257.102(c), closure will be complete when groundwater monitoring concentrations do not exceed the applicable groundwater protection standard established pursuant to 40 C.F.R. § 257.95(h) for constituents listed in appendix IV to 40 C.F.R. Part 257.

3 FINAL COVER REQUIREMENTS

The final cover system for in-place closure of the Ash Basin and FGD Ponds will be designed pursuant to 40 C.F.R. § 257.102(d). Closure of the Ash Basin and FGD Ponds will be conducted in a manner that controls, minimizes, or eliminates, to the maximum extent feasible, the post-closure infiltration of liquids into the CCR and releases of CCR, leachate, or contaminated run-off to the ground or surface waters or to the atmosphere.

The final cover system being considered is a composite (soil and geosynthetics) cover system consisting of (from top to bottom):

- A six-inch layer of soil that is capable of sustaining native plant growth;
- An 18-inch thick protective soil cover layer;
- A geocomposite drainage layer or non-woven geotextile; and
- A 40-mil thick linear low-density polyethylene geomembrane barrier.

Alternative final cover systems are also under evaluation that would meet, or exceed, the requirements specified in 40 C.F.R. § 257.102(d)(3)(ii), which make use of the latest developments in final cover technology. The final cover system will serve to reduce erosion and post-closure maintenance. Various stormwater control measures (e.g., diversion berms, channels, downslope pipes, and/or downchutes) will convey surface run-off from the cover to sediment basins (as appropriate), prior to discharge until the site is stabilized by vegetation. The design of the stormwater conveyances will include armoring and energy dissipation measures, as necessary, to control erosion and reduce maintenance and repairs.

The final cover system, with an equivalent (or lower) permeability of any bottom liner system or natural subsoils present, or permeability no greater than $1x10^{-5}$ centimeters/second, will be constructed and maintained to minimize the infiltration of precipitation. By minimizing infiltration, the final cover will reduce the potential of leachate generation. The final cover system will be graded to preclude the probability of future impoundment of water, sediment, or slurry.

The Ash Basin and FGD Ponds will be closed in a manner resulting in stable slopes that prevent the sloughing or movement of the final cover system. The grades of the final cover system will be generally slight, sufficient to promote run-off while reducing the potential for sloughing. Instability potential (sliding or sloughing) is further reduced through the selection and use of cover system materials that have adequate drainage properties and sufficient internal and interface shear strengths. Construction quality assurance procedures will be completed to confirm conformance of the installed final cover system to the design.

Upon commencement of closure of the Ash Basin and FGD Ponds, final closure is anticipated to be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices. Section 6, Closure Schedule, of this Closure Plan describes estimated time frames.

3.1 FINAL COVER SYSTEM

Pursuant to 40 C.F.R. § 257.102(d)(3)(i)(A) through (D), the final cover system will be designed and constructed to meet, at a minimum, the following criteria:

(A) The permeability of the final cover system will be less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1×10^{-5} centimeters/second, whichever is less.

The final cover system options being considered for the Ash Basin and FGD Ponds will meet or exceed these criteria. The geomembrane by itself results in a

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lower effective infiltration rate than the 18 inches of $1x10^{-5}$ centimeters/second soil standard.

(B) The infiltration of liquids through the Ash Basin and FGD Ponds will be minimized by the use of an infiltration layer that contains a minimum of 18 inches of earthen material.

The geomembrane component in the final cover system results in equivalent or better infiltration performance than 18 inches of earthen material. The proposed protective cover (18 inches) and vegetative layer soil will be obtained from local borrow sites and/or portions of the dams and dikes that will be lowered during closure. The gradation of the soil used in the cover will be such that it does not damage the geomembrane, provides drainage, resists erosion, and supports plant growth.

(C) The erosion of the final cover system will be minimized by the use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth.

The materials proposed for the vegetative support layer in the composite cover system option, or the protective cover component of an alternate final cover system, will provide equivalent or better performance than a six-inch-thick erosion layer. In addition, and prior to the completion of closure, stormwater run-off and wastewaters generated from areas outside the Ash Basin and FGD Pond's drainage catchment (which had previously been routed through the basin when it was active) will be permanently diverted for treatment (as needed) and discharge at other locations within the site.

(D) The disruption of the integrity of the final cover system will be minimized through a design that accommodates settling and subsidence.

The materials proposed for the final cover systems will accommodate the amount of settlement and subsidence that is anticipated to be encountered during construction and post-closure. In addition, the cover grades and stormwater conveyance system grades will be designed to accommodate settlement during construction and post-closure care.

The methods and procedures used to install the final cover will include:

1. Completing necessary field characterizations and design analyses;
2. Obtaining necessary federal, state, and local permits;
3. Preparing bid documents and selecting a qualified contractor;
4. Mobilizing;
5. Installing erosion and sediment control measures;
6. Removing and treating (as needed) the bulk water/free liquid;
7. Decontaminating and abandoning in place or removing the appurtenant structures within the Ash Basin and FGD Ponds;
8. Clearing and grubbing;

9. Constructing laydown areas and access roads;
10. Interstitial/pore dewatering and treatment (as needed);
11. Grading CCR materials to achieve design cover system subgrade elevations;
12. Installing the cover system and associated stormwater management controls;
13. Stabilizing the site with appropriate vegetation and final erosion and sediment control measures;
14. Lowering of the dam; and
15. Commencing post-closure maintenance and monitoring of the site.

3.2 DRAINAGE AND STABILIZATION

Bulk water/free liquids will be removed from the Ash Basin and FGD Ponds throughout multiple phases of construction. Interstitial/pore water may be removed and treated during construction (as needed) to provide a workable surface for final cover system installation. With the diversion of wastewater and the stormwater discharged to the basin from other locations on the site, the volume of interstitial/pore water within the basin is expected to further decline over time. The dam will be lowered following the final phase of cover system installation. Combined, these measures (diversion of wastewater and stormwater, bulk dewatering, selective interstitial/pore dewatering, cover system installation, and dam lowering) will stabilize the CCR materials sufficiently to support the final cover system.

4 ESTIMATE OF IN-PLACE CCR INVENTORY

The volume of CCR present in the Ash Basin and FGD Ponds was calculated and is presented in Table 1 below, pursuant to 40 C.F.R. § 257.102(b)(1)(iv). The volume is the estimated inventory of CCR that will be open (and require closure) at one time, and the estimate is based on bathymetric surveys, historical topography, and soil borings as of December 2015. The annual surface impoundment inspections completed, pursuant to 40 C.F.R. § 257.83(b), and posted to the Duke Energy CCR website, pursuant to 40 C.F.R. § 257.107(g)(5), contain the most recent estimates of CCR material in the Ash Basin.

Table 1. Estimated In-Place CCR Inventory

Basin	Quantity of CCR (cubic yards)
Ash Basin	5,271,000
FGD Settling Pond	186,000
FGD Forward Flush Pond	43,000
Total Inventory Within Ash Basin Footprint	**5,500,000**

5 ESTIMATE OF LARGEST AREA REQUIRING FINAL COVER

Closure of the Ash Basin will be accomplished by leaving CCR in place pursuant to 40 C.F.R. § 257.102(d). The largest area of the Ash Basin that will be open (and require a final cover) at one

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time is estimated to be 140 acres. The FGD Ponds are located within the Ash Basin footprint and are included in the area requiring final cover.

6 CLOSURE SCHEDULE

Closure of the Ash Basin and FGD Ponds will be initiated pursuant to 40 C.F.R. § 257.102(e) and is anticipated to be completed within seven years of the commencement of closure activities. The closure time frame includes a two-year time extension beyond the time specified in 40 C.F.R. § 257.102(f)(1)(ii) on the basis that the anticipated time required to close the Ash Basin and FGD Ponds will need to be lengthened due to:

- The Ash Basin being larger than 40 acres (estimated 140 acres);
- The amount of imported material needed to close the Ash Basin and FGD Ponds (estimated to be greater than 250,000 cubic yards);
- The volume of CCR (greater than 1.1 million cubic yards will need to be excavated and placed as grading fill);
- The volume of bulk water/free liquids to dewater (greater than 450 million gallons);
- The surrounding geology (shallow rock resulting in limited soil volume per given area, limited availability of soil meeting the permeability requirements outlined in the CCR Rule, rocks in the soil that could damage the geomembrane would need to be removed, etc.); and
- The time required, after the removal of bulk liquids, for the surface of the basin to stabilize to the point that personnel and equipment can safely access the impoundment. Given the site-specific geometry and physical characteristics of the CCR in the impoundment, the rate at which the materials will drain will likely be slow and variable. As a result, installation of instrumentation and monitoring equipment may be necessary in some instances to ensure subgrade stability is adequate, and other measures may need to be employed to stabilize the surface of the impoundment (possibly including closely-spaced well points, deep wells, trenches, etc.) in a timely manner.

The completed demonstration establishing why it is not feasible to complete closure of the Ash Basin and FGD Ponds within the five-year time frame due to factors beyond the facility's control will be prepared and placed in the facility's operating record prior to the end of any two-year period pursuant to 40 C.F.R. § 257.102(f)(2).

Prior to commencing closure construction, design documents will be prepared to support applications for required local, state, and federal permits. Closure construction design documents will include construction drawings, technical specifications, and quality assurance testing work plans. The permits required for closure construction activities will be evaluated at the time of closure and are anticipated to include permits from NCDEQ and the U.S. Army Corps of Engineers. Preliminary time frames of anticipated closure activities for the Ash Basin and FGD Ponds are included below in Table 2. Duke Energy estimates that all of the closure activities for the Ash Basin and FGD Ponds will be completed by 2026.

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Table 2. Estimated Time Frames for Closure Activities

Closure Activity	Time Frame (years)*
NCDEQ Closure Plan Approval	1
NCDEQ Permitting Approvals (NDPES, E&SC, Air)	1
Dewatering and Stabilization	2.5
CCR Grading and Excavation	1.5
NCDEQ Dam Decommissioning Approval	0.5
Final Cover Installation	3.5

*Estimated closure activity time frames may include some overlap

7 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I, Scott R. Ward, being a registered Professional Engineer in the state of North Carolina, do hereby certify to the best of my knowledge, information, and belief, that the information contained in this written Closure Plan dated October 10, 2016, was developed pursuant to 40 C.F.R. § 257.102 and has been prepared in accordance with recognized and generally accepted good engineering practices.

SIGNATURE _____ DATE 10/10/2016

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EXHIBIT 3

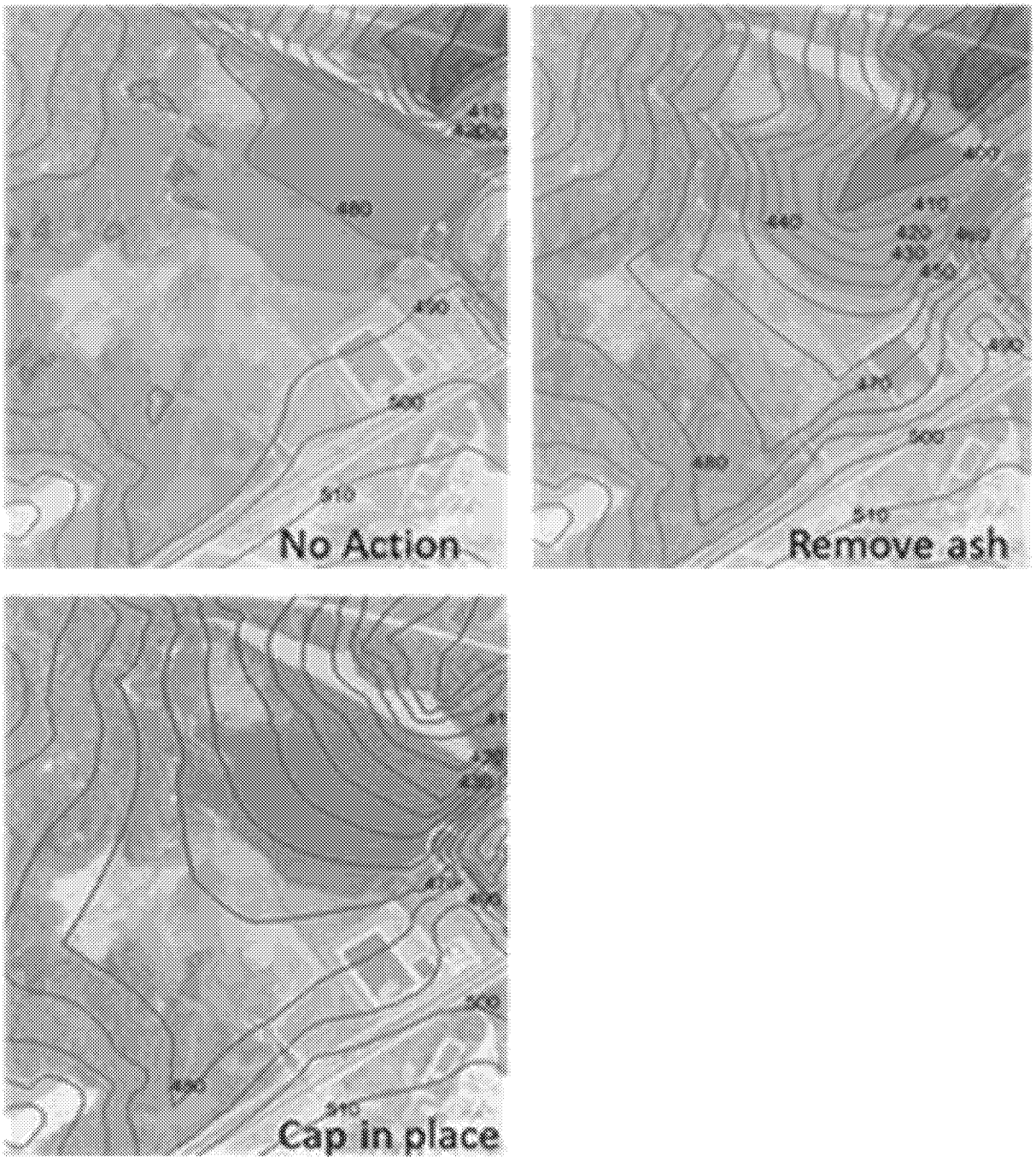

Figure 17a. Hydraulic head calculated in the vicinity of the ash basin for the different corrective actions.

EXHIBIT 4

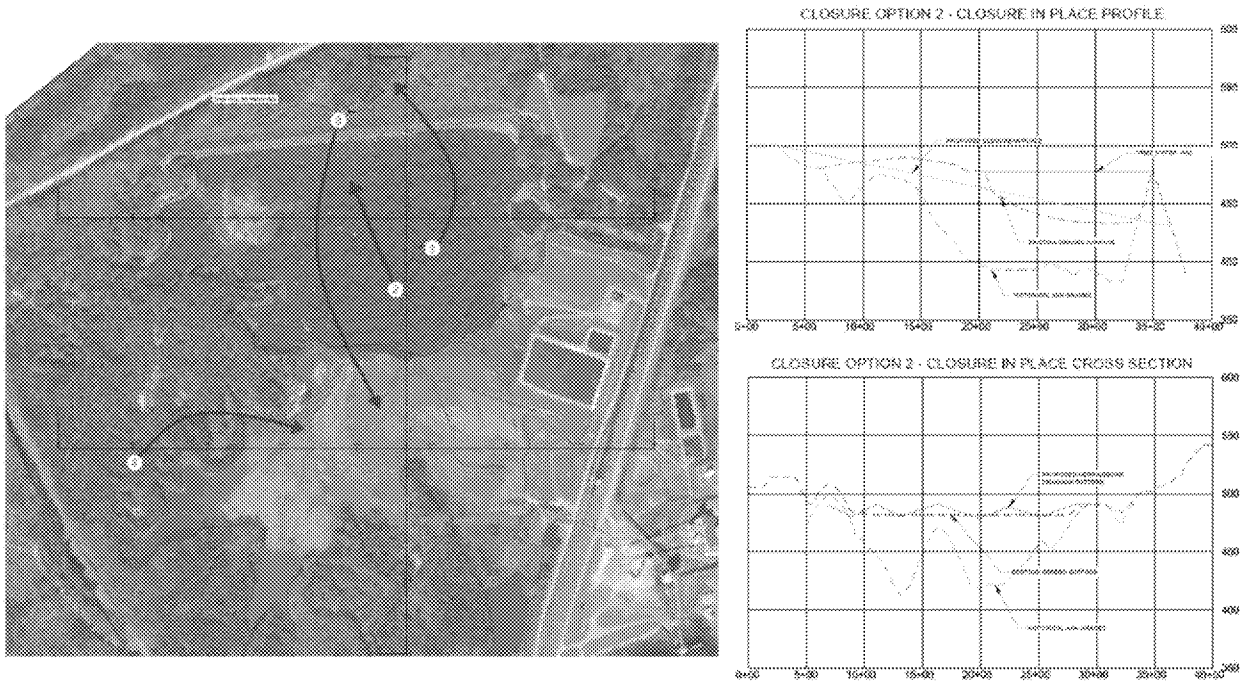

Figure 16. Map and cross-sections describing design of the Cap-in-Place design used to develop the model of this scenario.